

Dyke-brittle shear relation in the western Deccan Traps near Mumbai, India

Achyuta Ayan Misra^{1,2}, Soumyajit Mukherjee²

¹Petroleum Exploration, Reliance Industries Ltd. Navi Mumbai- 400 701, Maharashtra, INDIA. achyutaayan@gmail.com

²Department of Earth Sciences, Indian Institute of Technology Bombay, Powai, Mumbai, Maharashtra, INDIA.

Dykes are abundant in the Deccan Traps. Those near the west coast are termed “coastal swarm” that dominantly trend NW-SE to NE-SW and rarely E-W (Misra et al., 2014 and references therein). NW-SE to NE-SW trending brittle shears have also been reported from the same region. However, the detail relationship between the dykes and the brittle shears has not been reported. We report those in this study. Grooves due to wall-rock and magma interaction during dyke emplacement are reported from Kharghar Hills (Misra, in press) and Karnala. At Korlai-Murud coastal stretch, the 2.5 cm to ~ 3 m wide dykes and their relations with brittle shears vary. The ~ N-S and NW-SE dykes show the following geometries: (i) the dykes are sheared and the brittle shears are confined within them, mostly along their margins, while their cores are unsheared; (ii) the dykes are sheared and the brittle shear continues within the country rock: these dykes are shear-band boudinaged, else are en-echelon spindle-shaped, and some contain 'bridges' of country rocks within the disconnected segments and apophyses; (iii) dykes intrude P- and Y-planes of the brittle shears; (iv) dykes intrude many pre-existing fractures such as cooling joints. 2.5-5 cm thick dykes only follow this geometry. Following these geometries and the wall-magma interaction structures, we conclude that a significant number of these dykes intruded coeval to or after the brittle shear. This matches Correa-Gomes et al.'s (2001) interpretation. The ~ N-S/NW-SE/NE-SW extension derived from these structures also matches the previous study by Misra et al. (2014). Also see Misra et al. (in press).